ASAHI AV Valves

Serial No.	H – V027 E – 2

Ball Valve Type 21

User's Manual

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ASAHI ORGANIC CHEMICALS INDUSTRY CO., LTD.

(1) General operating instruction

○ Operate the valve within the range of the published working temperature and pressure.
（The valve can be damaged by operation beyond the maximum allowable range of temperature vs pressure.）

○ To select a valve in appropriate materials, refer to “CHEMICAL RESISTANCE ON ASAHI AV VALVE”.
（Some chemicals give heavy damage to valve materials.）

○ The valve is not designed to bear any kind of external load. Never stand on or place anything heavy on the valve at anytime.

○ When the valve is disposed of, contact waste disposal specialist.
(The valve generates toxic gas.)

○ The valve should be installed at place where space for periodic inspection & maintenance is sufficient.

○ Do not store or install the valve near any heat source or hot surface.

○ Do not use the valve for fluid containing slurry. (The valve will not operate properly.)

○ Do not use the valve on condition that fluid has crystallized.
(The valve will not operate properly.)

○ Caution: Certain liquid such as H2O2, NaC1O, etc may be prone to vaporization which may cause irregular pressure increases, which may destroy the valve.

(2) General instructions for transportation, unpacking and storage

○ Keep the valve in its original packaging until needed for installation.

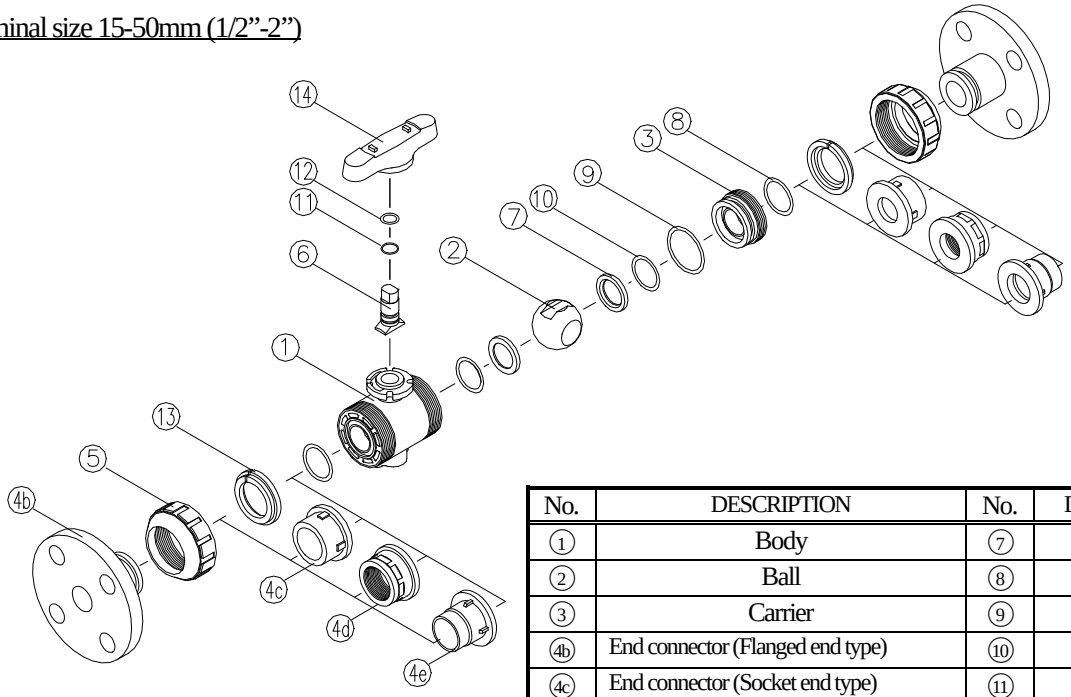
○ Avoid contact with any coal tar creosote, insecticides, vermicides or paint.
（The force of swelling may damage the valve.）

○ The valve is not designed to handle any kind of impact. Avoid throwing or dropping the valve.

○ Avoid scratching the valve with any sharp object.

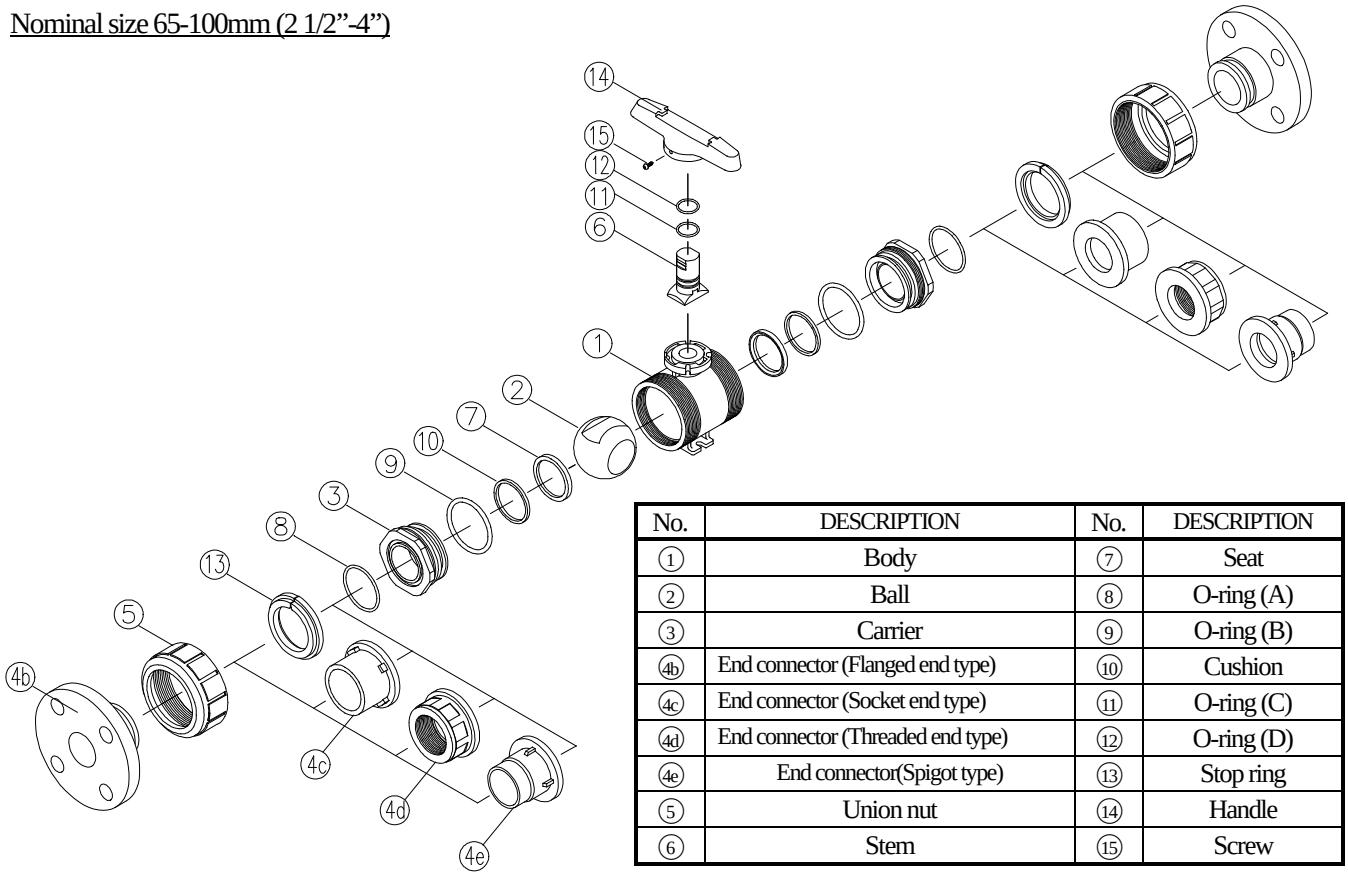
(3) Name of parts

Nominal size 15-50mm (1/2”-2”)



No.	DESCRIPTION	No.	DESCRIPTION
①	Body	⑦	Seat
②	Ball	⑧	O-ring (A)
③	Carrier	⑨	O-ring (B)
④b	End connector (Flanged end type)	⑩	O-ring (C)
④c	End connector (Socket end type)	⑪	O-ring (D)
④d	End connector (Threaded end type)	⑫	O-ring (E)
④e	End connector(Spigot type)	⑬	Stop ring
⑤	Union nut	⑭	Handle
⑥	Stem		

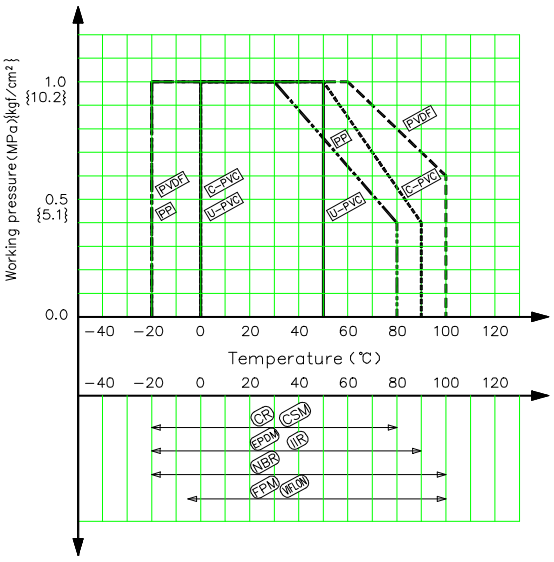
Nominal size 65-100mm (2 1/2”-4”)



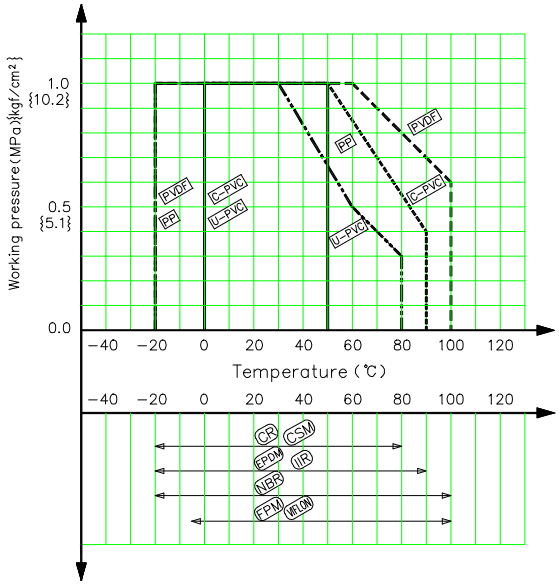
No.	DESCRIPTION	No.	DESCRIPTION
①	Body	⑦	Seat
②	Ball	⑧	O-ring (A)
③	Carrier	⑨	O-ring (B)
④b	End connector (Flanged end type)	⑩	Cushion
④c	End connector (Socket end type)	⑪	O-ring (C)
④d	End connector (Threaded end type)	⑫	O-ring (D)
④e	End connector(Spigot type)	⑬	Stop ring
⑤	Union nut	⑭	Handle
⑥	Stem	⑮	Screw

(4) Comparison between working temperature and pressure

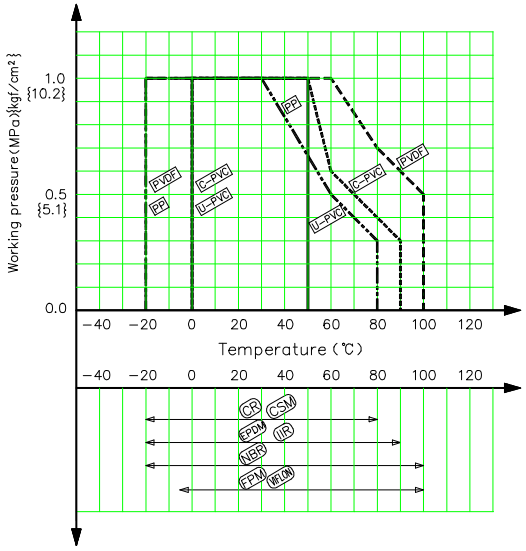
Nominal size: 15mm-50mm (1/2”-2”)



Nominal size: 65mm (2 1/2”)



Nominal size: 80mm, 100mm (3”, 4”)



Caution

Do not operate the valve beyond the range of working temperature and pressure.
(The valve can be damaged.)

(5) Installation procedure

Flanged type (Material: PVC, C-PVC, PP, PVDF)

Necessary items

- Torque wrench
- Spanner wrench
- AV gasket
- Bolt, Nut, Washer (For many flanges specification)

(When a non-AV gasket is used, a different tightening torque specification should be followed.)

Procedure

1) Set the AV gasket between the flanges.

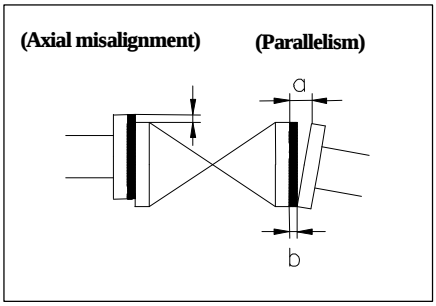
2) Insert washers and bolts from the pipe side, insert washers and nuts from the valve side, then temporarily tighten them by hand.

Remark

The parallelism and axial misalignment of the flange surface should be below the values in the following
(A failure to observe them can cause destruction due to stress application to the pipe)

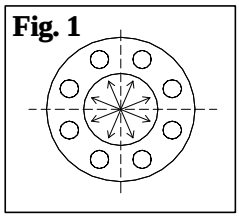
Unit : mm (inch)

Nom. Size	Axial Misalignment	Parallelism (a-b)
15-25mm (1/2"-1")	1.0 (0.04)	0.5 (0.02)
40-80mm (1 1/2"-3")	1.0 (0.04)	0.8 (0.03)
100mm (4")	1.0 (0.04)	1.0 (0.04)



3) Using a torque wrench, tighten the bolts and nuts gradually to the specified torque in a diagonal manner (Refer to fig.1.)

Fig. 1



Specified torque value

Unit : N-m {kgf-cm} [lb-inch]

Nom. Size	15mm (1/2")	20mm (3/4")	25mm (1")	32mm (1 1/4")	40mm (1 1/2")	50mm (2")	65mm (2 1/2")	80mm (3")	100mm (4")
Torque value	17.5 (179) [155]	17.5 (178) [155]	20.0 (204) [177]	20.0 (204) [177]	20.0 (204) [177]	22.5 (230) [200]	22.5 (230) [200]	30.0 (306) [266]	30.0 (306) [266]

Remark

Avoid excessive tightening. (The valve can be damaged.)

Threaded type (Material : PVC,C-PVC,PP,PVDF)

Necessary items

- Sealing tape (A non-sealing tape can cause leakage.)
- Strap wrench (Do not use Pipe wrench.)
- Spanner wrench

Remark

Make sure that the threaded connections are plastic x plastic.
(Metallic thread can cause damage.)

Procedure

1) Wind a sealing tape around the external thread of joint, leaving the end (about 3mm) free.

2) Loosen the union nut ⑤ with a strap wrench..

3) Remove the union nut ⑤ and the end connector ④d.

4) Lead the union nut ⑤ through the pipe.

5) Tighten the external thread of the joint and the end connector ④d lightly by hand.

6) Using a spanner wrench, screw in the end connector ④d by turning 180 ° -360 ° carefully without damaging it.

Remark

Avoid excessive tightening. (The valve can be damaged.)

7) Make sure that the O-ring (A) ⑧ is mounted.

8) Set the end connector ④d and union nut ⑤ directly on the body without allowing the O-ring (A) ⑧ to come off.

9) Tighten the union nut ⑤ lightly by hand.

10) Using a strap wrench, screw it in by turning 90 ° - 180 ° carefully without damaging it.

Remark

Avoid excessive tightening. (The valve can be damaged.)

Socket type (Material : PVC,C-PVC)

Necessary items

- Adhesive for hard vinyl chloride pipes
- Strap wrench (Do not use the pipe wrench)

Remark

Do not install a socket type valve where the atmospheric temperature is 5℃ or lower.
(The valve can be damaged.)

Procedure

1) Loosen the union nut ⑤ with a strap wrench.

2) Remove the union nut ⑤ and end connector ④c.

3) Lead the union nut through the pipe.

4) Clean the hub part of the end connector ④c by wiping the waste cloth.

5) Apply adhesive evenly to the hub part of the end connector ④c and the pipe spigot.

Remark

Do not apply more adhesives than necessary.
(The valve can be damaged due to solvent cracking.)

Adhesive quantity (guideline)

Nom. Size	15mm (1/2")	20mm (3/4")	25mm (1")	32mm (1 1/4")	40 (1 1/2")	50 (2")	65 (2 1/2")	80 (3")	100 (4")
Quantity (g)	1.0	1.3	2.0	2.4	3.5	4.8	6.9	9.0	13.0

6) After applying adhesive, insert the pipe quickly to the end connector ④c and leave it alone for at least 60 seconds.

7) Wipe away overflowing adhesive.

8) Make sure that O-ring(A) ⑧ is mounted

9) Set the end connector ④c and union nut ⑤ directly on the body without allowing the O-ring (A) ⑧ to come off.

10) Tighten the union nut ⑤ lightly by hand.

11) Using a strap wrench, screw it in by turning 90 ° -180 ° carefully without damaging it.

Remark

Avoid excessive tightening. (The valve can be damaged.)

Socket type (Material : PP,PVDF)

Necessary items

- Strap wrench (Do not use the pipe wrench.)
- Sleeve welder or automatic welding machine
- User's manual for sleeve welder or automatic welding machine

Procedure

1) Loosen the union nut with a strap wrench.
2) Remove the union nut ⑤ and the end connector.
3) Lead the union nut ⑤ through the pipe.
4) For the next step, refer to the user's manual for the sleeve welder or the automatic welding machine.
5) After welding, make sure that the O-ring (A) ⑧ is mounted.
6) Set the end connector ④c and the union nut ⑤ directly without allowing the O-ring (A) ⑧ to come off.
7) Tighten the union nut ⑤ lightly by hand.
8) Use a strap wrench, screw it in by turning 90 ° -180 ° carefully without damaging it.

Remark

Avoid excessive tightening. (The valve can be damaged.)

Spigot type (Material : PVDF)

Necessary items

- Strap wrench (Do not use the pipe wrench.)
- Automatic welding machine
- User's manual for automatic welding machine

Procedure

1) Loosen the union nut with a strap wrench.
2) Remove the union nut ⑤ and the end connector.
3) Lead the union nut ⑤ through the pipe.
4) For the next step, refer to the user's manual for the sleeve welder or the automatic welding machine.
5) After welding, make sure that the O-ring (A) ⑧ is mounted.
6) Set the end connector ④e and the union nut ⑤ directly without allowing the O-ring (A) ⑧ to come off.
7) Tighten the union nut ⑤ lightly by hand.
8) Use a strap wrench, screw it in by turning 90 ° -180 ° carefully without damaging it.

Remark

Avoid excessive tightening. (The valve can be damaged.)

Caution

{15mm-50mm(1/2”-2”)}

It is recommended to install the valve with the threaded carrier to the upstream side of the system.

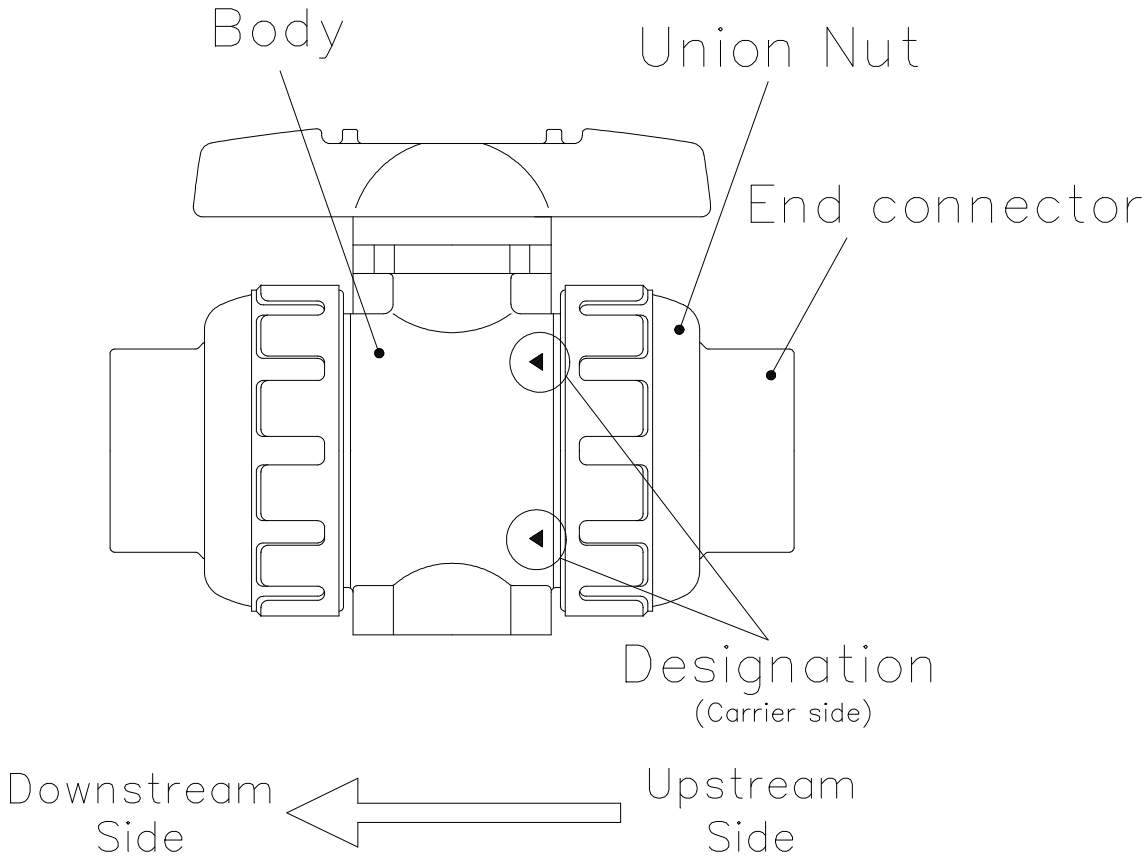
This allows for an increase safety factor and eliminating a threaded connection when used as a blocking valve.

This also allows the down stream union nut and end connector to be removed safely under pressure.

It increases the safety where there is no chance of thread leakage or accidentally removing the carrier.

The designation of the up stream side (non threaded carrier is marked as shown) on the body.

Nominal size 15mm - 50mm (1/2” – 2”)



(6) Operating Procedure

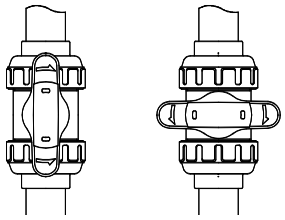
Remark

Avoid excessive tightening. (The valve can be damaged.)

○ Turn the handle gently to open or close.
(Turn the handle clockwise to close and counter clockwise to open.)

Fully closed ····· The position of the handle should be perpendicular to the pipe.

Fully opened ····· The position of the handle should be parallel to the pipe.



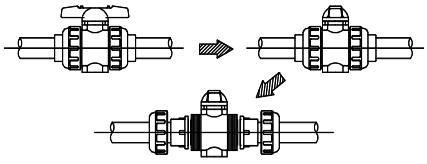
Fully opened **Fully closed**

(7) Method of Adjusting Face Pressure between Ball and Seat

Necessary items

- Strap wrench
- Protective gloves
- Safety goggles
- Screwdriver (+) (only with nominal size 65～100mm)

Procedure



1) Completely discharge fluid from pipes.
2) Turn the handle to full close.
3) Loosen the right union nut and the left one ⑤ with a strap wrench.
4) Remove the body part from piping system.

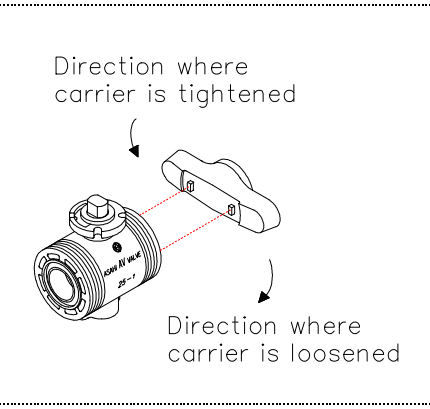
Caution

Wear protective gloves and safety goggles as some fluid remains in the valve. (You may be injured.)

5) Pull the handle off the body part.

Caution

As for nominal size 65-100mm (2 1/2”-4”), loosen the screw ⑮ properly with a screwdriver before pulling it off..



6) Engage the upper convex part of the handle with the concave part of the union ③.

Caution

As for nominal size 15-50mm
Only the union ③ on the right side when viewed from the trademark (AV mark) can be adjusted.
As for nominal size 65-100mm
adjust the unions on both sides.

7) Make an adjustment by turning the union clockwise (to tighten it) or counter clockwise (to loosen it).
8) Make sure that the handle can be operated smoothly.
9) Assemble the valve by following the above procedure in the reverse order, starting at 6)

(8) Disassembling Method for Replacing Parts

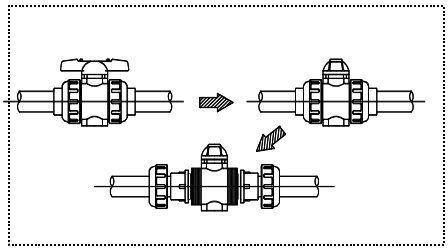
Necessary items

- **Strap wrench**
- **Safety goggles**
- **Protective gloves**

Caution

Wear protective gloves and safety goggles as some fluid remains in the valve.
(You may be injured.)

<Disassembly>

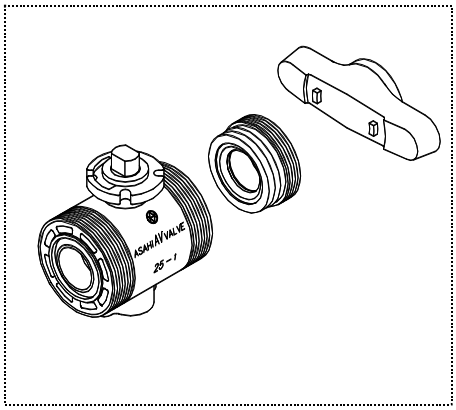


Procedure

1) Completely discharge fluid from pipes.
2) Turn the handle to full close.
3) Loosen the right union nut and the left one ⑤ with a strap wrench.
4) Remove the body part from piping system.
5) Pull the handle off the body part.

Remark

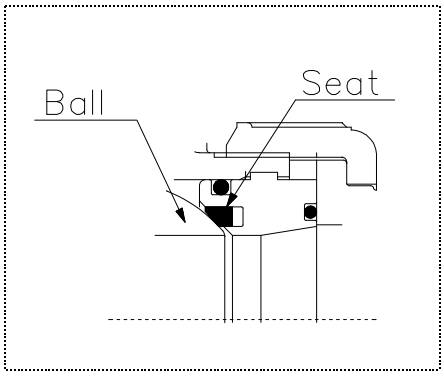
As for nominal size 65-100mm (2 1/2"-4"), loosen the screw ⑮ properly with a screwdriver before pulling it off..



6) Engage the upper convex part of the handle with the concave part of the union.

Remark

As for nominal size 15-50mm
Only the union ③ on the right side when viewed
from the trademark (AV mark) can be adjusted.
As for nominal size 65-100mm, adjust the unions on both sides.



7) In the engaged state, turn the handle ⑭ counter clockwise to loosen it and remove the union ③.
8) Remove the seat ⑦ carefully by hand without damaging it.
9) Push out the ball ② by hand.
10) Push out the stem ⑥ from the top flange side to the body side.

<Assembly>

Procedure

Carry out the assembly work in the reverse procedure from item 10)

Caution

With regard to item 8), before installing seat ⑦ on the valve, check the seat for its face and back.

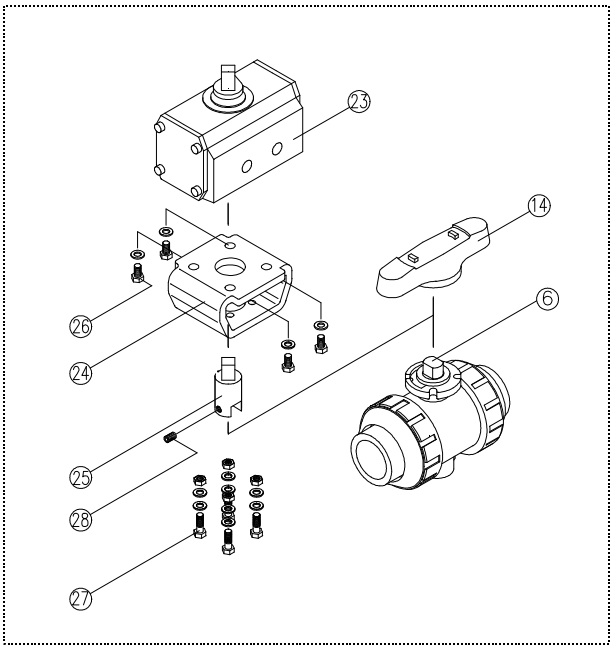
(9) Mounting actuator, Ensat and base (panel)

○ Attach actuator to the top flange

Procedure

1) Remove the handle ⑭.

> Remark
> As for nominal 65mm-100mm, tighten the screw ⑮ properly before removing it.



2) Fix the stand ㉔ to actuator ㉓ with bolt (A).

3) Fix the stem ⑥ to the joint ㉕ with screw (B) ㉘.

4) Engage the joint ㉕ with actuator ㉓.

5) Fix the stand ㉔ to the top flange with bolt-nut (B) ㉗.

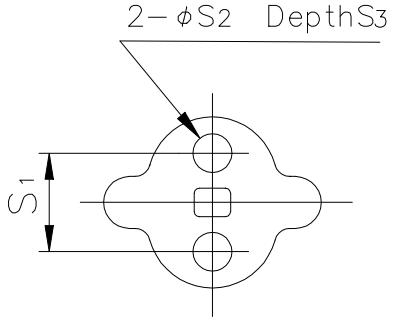
6) Make sure that the valve works smoothly, by operating actuator ㉓ by hand.

○ Attach Inserted metal to the bottom stand.

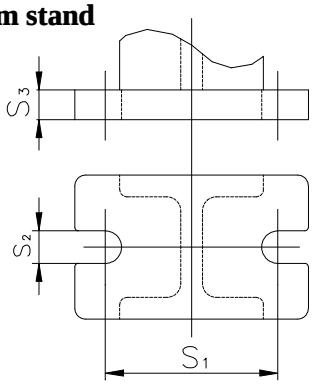
Procedure

Refer to the user's manual for the Inserted metal (Commercially available.)

Nominal 15-50mm(1/2"-2")
Bottom stand



Nominal 65-100mm (2 1/2"- 4")
Bottom stand



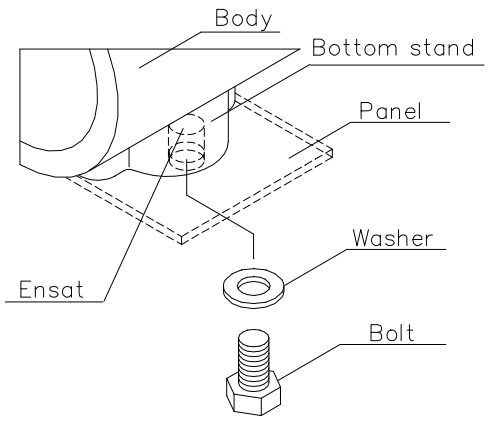
Bottom stand dimension **Unit; mm**

Nom.Size	S1	S2	S3
15mm (1/2")	19	7.3	11
20mm (3/4")	19	7.3	11
25mm (1")	19	7.3	11
32mm (1 1/4")	30	9	15
40mm (1 1/2")	30	9	15
50mm (2")	30	9	15
65mm (2 1/2")	48	9	6
80mm (3")	55	11	7
100mm (4")	65	11	8

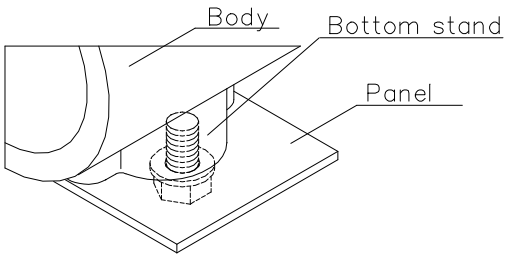
○Fixation of bottom stand with panel

Nominal size: 15mm-50mm (1/2”-2”)

Before the fixation

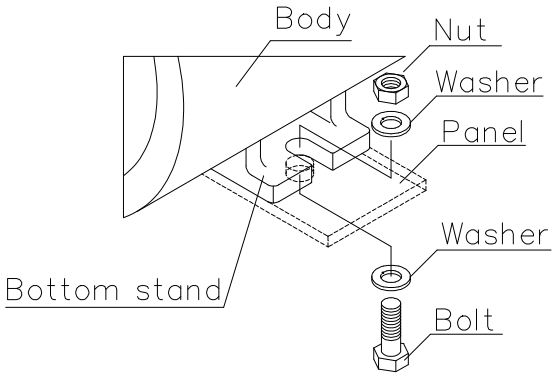


After the fixation

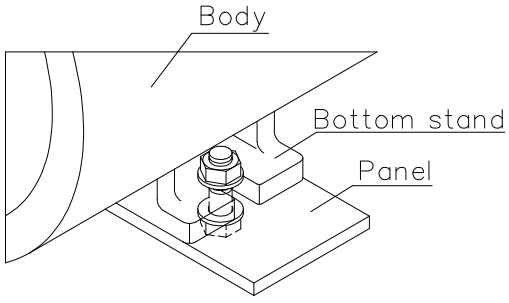


Nominal size: 65mm-100mm (2 1/2”-4”)

Before the fixation



After the fixation



(10) Inspection items

○Inspect the following items;

(1)	Check for any flaw, crack, or deformation on the outside.
(2)	Check whether fluid leaks to the outside.
(3)	Check whether tightness of bolt nut.
(4)	Check whether the operation of the handle is smooth.

(11) Troubleshooting and action

Problem	Cause	Action
Fluid leaks from the valve even when the valve is closed fully.	The carrier is loosened.	Adjust the face pressure between the ball and the seat. (Refer to page 9)
	The seat is scratched or worn.	Replace the seat with a new one.
	Foreign matter is in the valve.	Clean up.
	The ball is scratched or worn.	Replace the scratched ball with a new one.
Fluid leaks from the valve.	The union nut is loosened.	Tighten up the union nut.
	The carrier is loosened.	Adjust the face pressure between the ball and the seat. (Refer to page 9)
	The O-ring is scratched or worn.	Replace the O-ring with a new one.
The handle can not be turned smoothly.	Foreign matter is in the valve.	Clean up.
	Deformation. (By heat etc.)	Replace the parts.
The handle fails to engage.	The stem is broken.	Replace the stem with a new one.
	The engagement between the stem and the ball is broken.	Replace the stem and ball with new ones.

(12) Handling of residual and waste materials

Remark

In discarding remaining or waste materials, be sure to ask waste service company.
(Poisonous gas is generated.)

(13) Inquiries

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Ball Valves Type 21

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